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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/609,499	07/01/2003	Jong-Jin Lee	053933-5046	1723

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EXAMINER	
HA, NATHAN W	

ART UNIT	PAPER NUMBER
2814	

DATE MAILED: 11/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/609,499	LEE ET AL.	
	Examiner	Art Unit	
	Nathan W. Ha	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 August 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *7-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *7-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The previous 112 rejections have been withdrawn due to the newly added amendment.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 7-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over the Anstrom et al. (US 6,407,341, previously citer, hereinafter, Anstrom) and in view of Iijima et al. (US 2003/0011070, previously cited, hereinafter, Iijima) and in view of Mashino (US 6,507,497, newly cited.)

In regard to claims 7 and 8, in fig. 9, Anstrom discloses a package substrate STRUCTURE, comprising:

a base substrate 70, col. 9, lines 25-26, a laminated substrate formed with a plurality of through holes 140, col. 9, line 25;

a first copper layer, not numbered in fig.9, but same as layer 66 in fig. 6, where the layer is plated on predetermined portions of the through holes, see col. 10, lines 52-67;

a pattern layer, also the layer in the via, same as layer 66, formed on the first copper layer;

wire bonding pads 129 formed on predetermined portions of the pattern layer at an upper surface of the base where the portions of copper have been removed to exposed portions of the substrate, the wire bonding pads are not connected to a remnant of a plating lead line since there is no lead line or remnant portions therein;

solder ball pads, also 129, formed on predetermined portions of the pattern layer at a lower surface of the base substrate, the opposite, the pads and also not connected to a remnant of a plating lead line; and

a solder resist 132, col. 9, lines 61-66, having a first portion contacting the upper surface of the substrate and the plated pattern layer and a second portion contacting the lower surface of the base substrate and the pads, fig. 9.

Anstrom, however, shows the first layer and pattern circuit layers as one layer. It should be noted that since the first layer and the second patterned layer as currently claimed are made copper material, same material, the layer as shown in Anstrom may be subdivided into two layers, or it is equivalent to two or more layers.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to recognize that the one layer may be subdivided into multiple layers in order to create a certain thickness which provides a stable electrical connection.

Furthermore, Anstrom, however, does not expressly disclose the connection pads and wiring pads are made of gold. It should be noted that gold material is widely

use for its well known of high conductivity and better contact since gold prevents oxidation from oxygen, and it is a common material for electrical connections. For instance, Iijima, in fig. 2, discloses an analogous package 20 including a substrate 21 with through hole (section [0035], lines 1-8), wiring layers 25 (section [0035], lines 9-10), pad connections pads 33 formed on top and bottom of the substrate, which made of gold (section [0036], lines 1-4) in order to have a better electrical contact between devices and prevent the pads from oxidation.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to substitute gold material for the pad connections as taught by Iijima in Anstrom's invention in order to improve electrical contact since gold has high conductivity constant and prevent damage from oxidation.

It is further noted that gold is mentioned in the Applicants' admitted prior art as also a well-known material using as pad connections. See the prior art discussions on page 6 and fig. 3i, wherein the bonding pad layer 18 is made of gold, Au.

In regard to the limitations, as previously addressed, " plated, electrolytic Au plating, electroless plated, and serves as a plating lead line, and CCL (claim12), and 'removed step' " in claims 7-9 and 11-13 are taken to be a product by process limitation, it is the patentability of the claimed product and not of recited process steps which must be established.

Therefore, when the prior art discloses a product which reasonably appears to be identical with or only slightly different than the product claimed in a product-by process claim, a rejection based on sections 102 or 103 is fair. A product by process claim

directed to the product per se, no matter how actually made, In re Hirao, 190 USPQ 15 at 17 (footnote 3). See In re Fessman, 180 USPQ 324,326(CCPA 1974); In re Marosi et al., 218 USPQ 289,292 (Fed. Cir. 1983); and particularly In re Thorpe, 227 USPQ 964,966 (Fed. Cir. 1985), all of which make it clear that it is the patentability of the final structure of the product "gleaned" from the process steps, which must be determined in a "product by process " claim, and not the patentability of the process. See also MPEP 2113. Moreover, an old or obvious product produced by a new method is not a patentable product, whether claim in "product by process" claim or not.

Furthermore, the limitation, "which serves as a plating lead line" is a functional limitation. The copper layer as taught by the above combination inherently performs the same function since it is made of the same material and in a structure, which is analogous to the structure as currently claimed.

In regard to the newly added limitation such the plated pattern layer at an upper surface of the substrate where portions of the first layer have been removed. The previously cited references, Anstrom and Likima, do not clearly show this newly added limitation. Mashino, in figs. 1-4, teaches an analogous device and further teaches that a conductive layer 24 is formed on the conductive layer 16 and also on the portions where portions of the layer 16 have been removed in order to provide a reliable electrical contacts therein.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to from a layer as taught by Mashino in order to improve electrical contacts on the substrate.

In regard to claims 8-11, as mentioned above pattern and electrode layers are made of copper, and AU plating is in fact a product by process limitation (see above discussion.)

Furthermore, in regard to claim 10, the combination does not expressly teach the thickness of the first copper layer as claimed, .0-1.5 microns.

At the time of the invention was made, it would have been obvious to a person of ordinary skill in the art to modify the thickness of the above layer because applicant has not disclosed that thickness provides an advantage, is used for a particular purpose, or solves a stated problem. One of ordinary skill in the art, furthermore, would have expected applicant's invention to perform equally well with either shape because they perform the same function of connecting the module through the substrate to the solder balls electrically.

Therefore, it would have been obvious to one of ordinary skill in the art to modify the combination in order to obtain the invention as specify in the above claim.

Indeed, it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, In re Rose, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); In re Dailey, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Note that the specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising therefrom. Where patentability is aid to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

In regard to the limitation "plated", as addressed above, this is a product by process limitation. Please above discussion regarding to claims 7-9, and 11, wherein the product by process limitations are clearly addressed.

In regard to claim 12, Anstrom further discloses the base substrate is a laminated substrate, same as CCL. See fig. 9.

In regard to claim 13, the solder resist layer in Anstrom, as mentioned above, covers portions of the wire bonding pads and exposed other portions solder pads. See also Anstrom's fig. 9, for example.

In regard to claim 14, and in addition to the discussions of claim 7, Anstrom further discloses second layer fills the through holes, fig. 9, for example.

Response to Arguments

4. Applicant's arguments with respect to claims 7-14 have been considered but are moot in view of the new ground(s) of rejection. In addition, as mentioned above, the newly added limitation clearly redefines the claimed subject matter. Hence, the 112 rejection is withdrawn. The new rejections are established to further address the newly amended limitations to claim 7. Furthermore, in response to the Applicants arguments,

The Applicant mainly argues a method of how to form the device. It should be noted that, also as repeatedly addressed by the Office, a method of making a device in a claimed structure is not given patentable weight, please see above for example. A conversation with Mr. Hardy on October 27, 2006 is summarized in the interview summary which is enclosed herein.

Conclusion

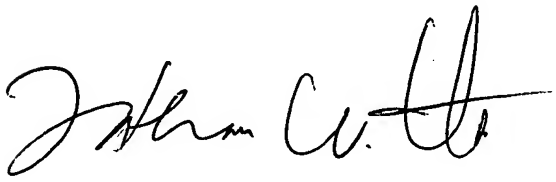
5. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan W. Ha whose telephone number is (571) 272-1707. The examiner can normally be reached on M-TH 8:00-7:00(EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Nathan Ha
Primary Examiner
October 25, 2006